

Zimmerwald Counter Comparisons



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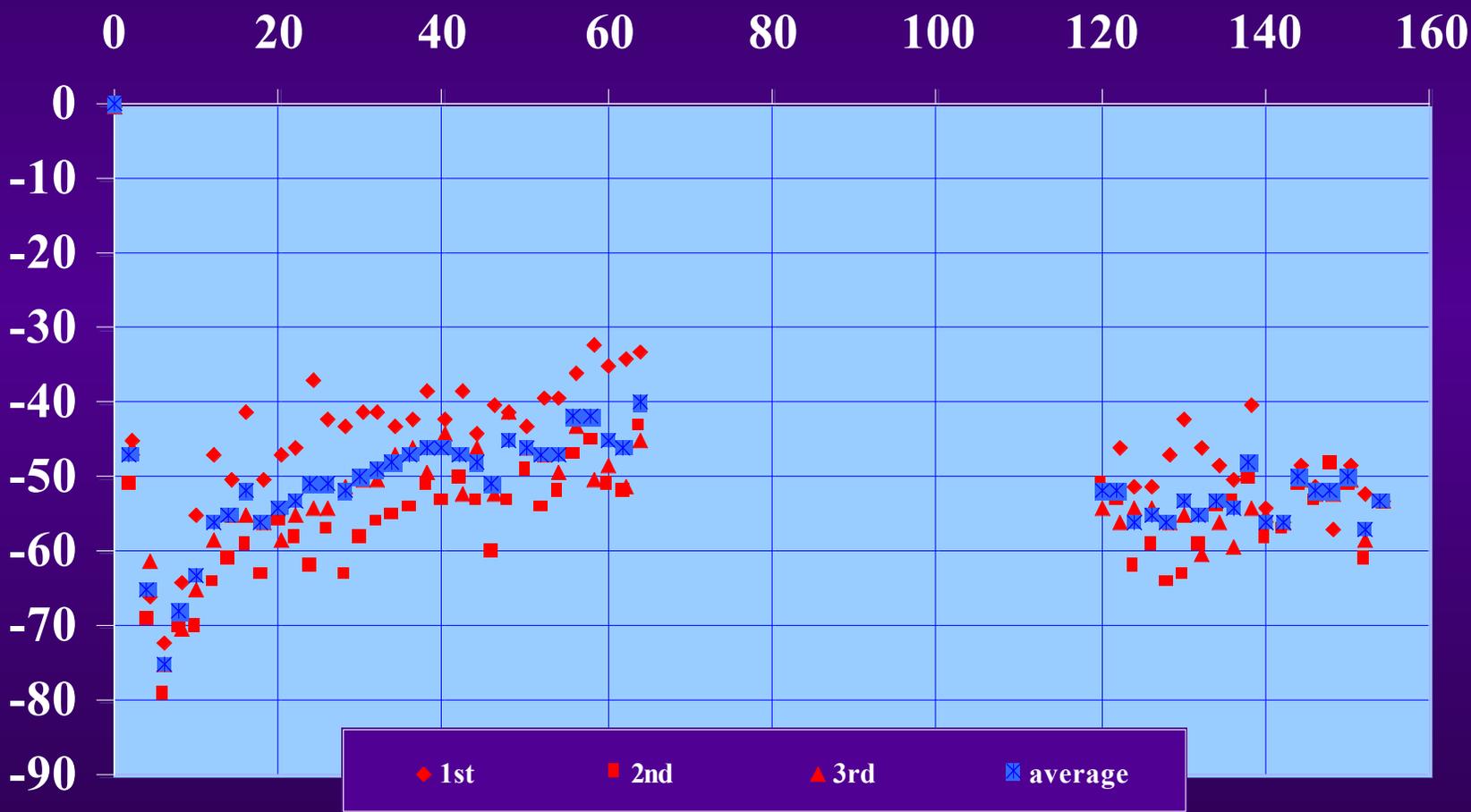


Counter Comparisons in Herstmonceux

- ◆ During visit at Herstmonceux in March 2002:
Comparison of Stanford counter # 3113 with
Herstmonceux reference counter
- ◆ Three series from 0 to 64 ms and 120 to 154
ms time interval
- ◆ Data collected and provided by Philip Gibbs, Herstmonceux



HERS-3113: Three Series and Average





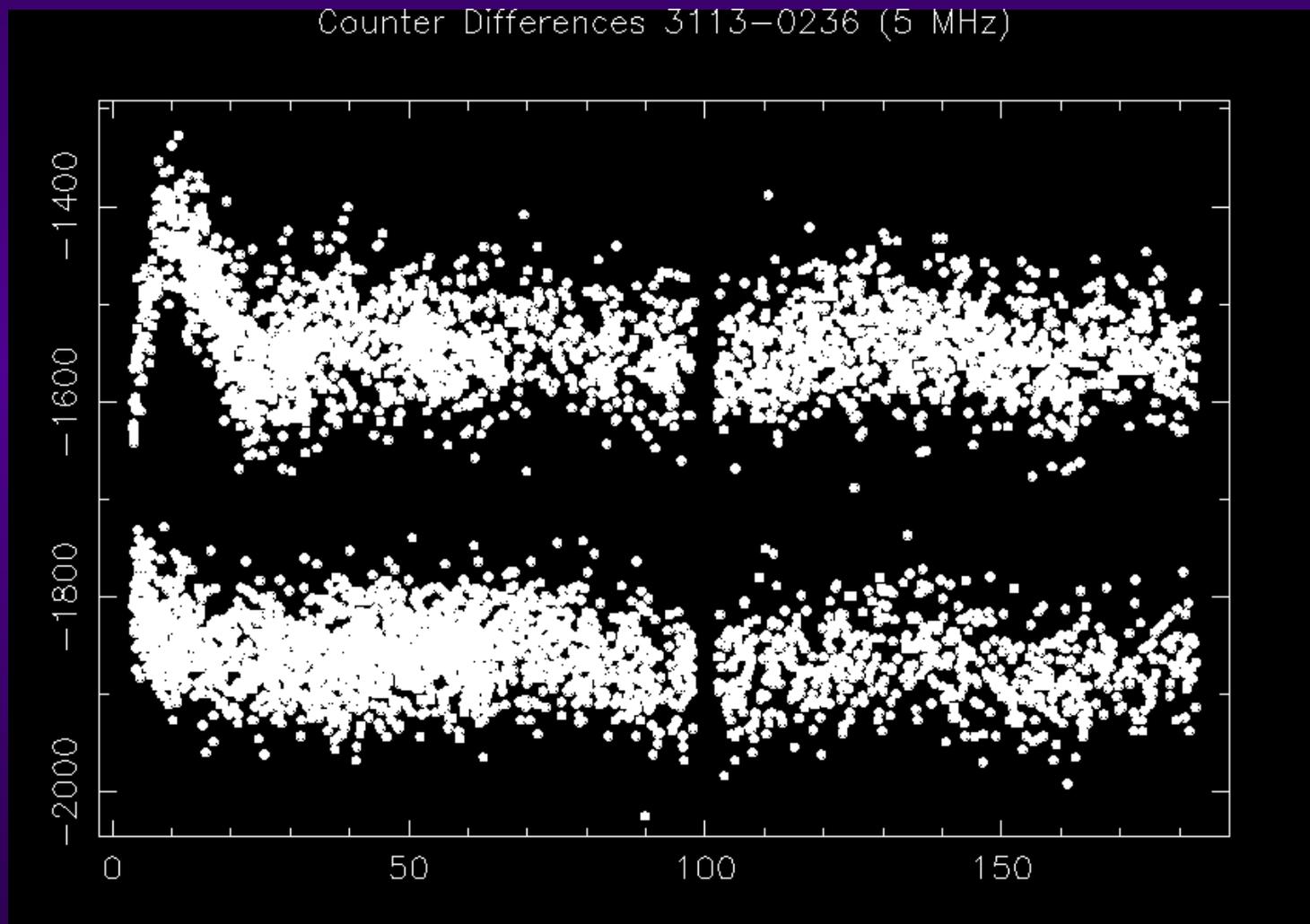
Counter Comparisons in Zimmerwald

- ◆ **Generate artificial ephemeris file**
 - ◆ Constant azimuth and elevation
 - ◆ Ranges change linearly from 0 ms to ~160 ms
- ◆ **Split output signal of PM, feed stop pulse to both counters**
- ◆ **Run the tracking program with this ephemeris file at daytime**
- ◆ **Open range gate window**
 - Background noise return at each shot
- ◆ **Form range differences between counters in bins of e.g., 5 ms., combine with flat target (calibration) observations**



Zimmerwald: 0236-3113 (5 MHz)

Counter Differences 3113-0236 (5 MHz)



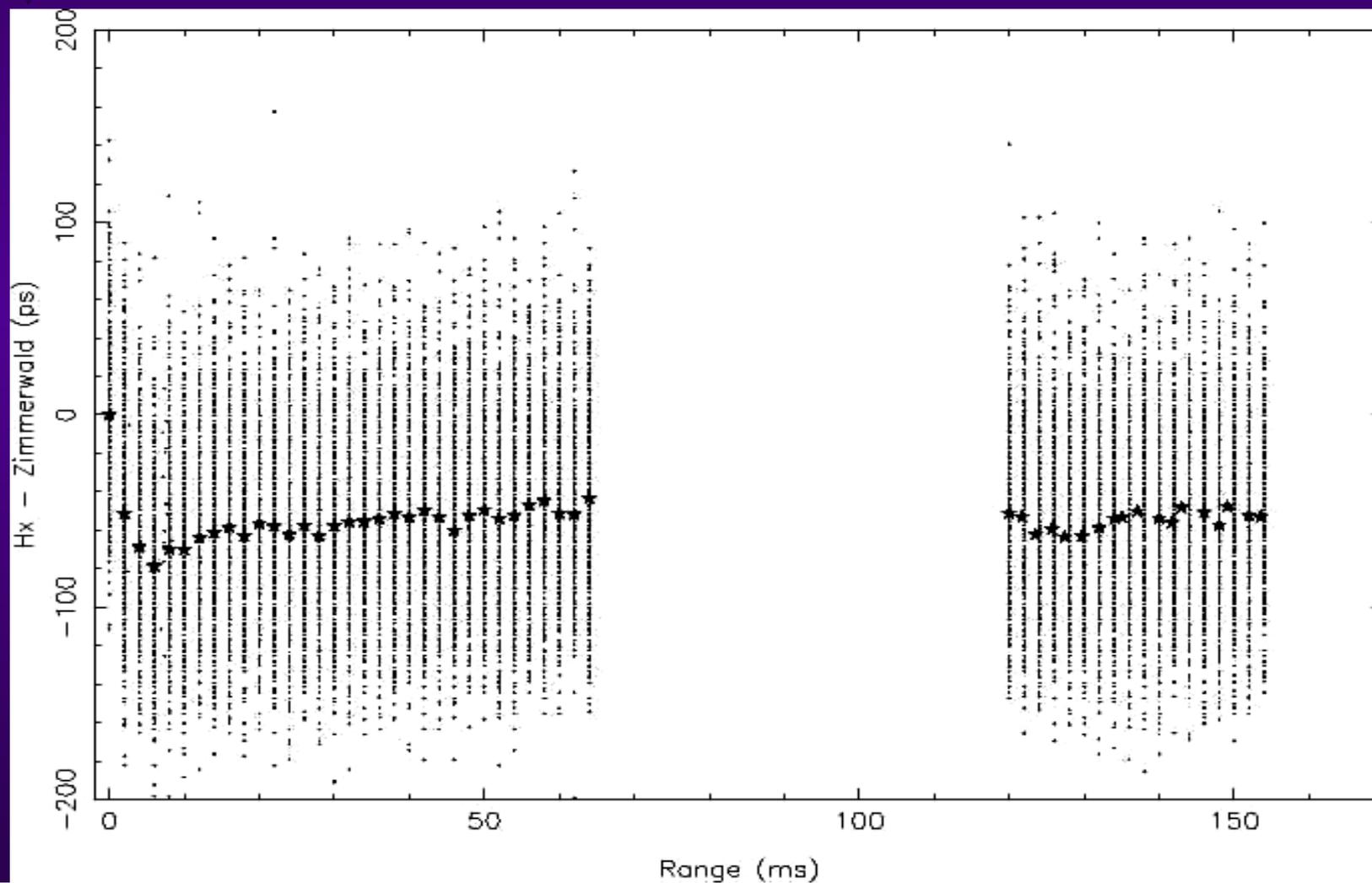


Stanford Counters on 5 MHz

- ◆ Counter comparisons show strange behaviour of the counter differences
- ◆ Detailed investigation of Herstmonceux comparison does not show any problems
- ◆ Comparison of range residuals on a satellite confirm problems on two counters (#3113 and #2282)
- ◆ One counter (#0236, our primary counter) seems to be OK
- ➔ Change of input frequency to 10 MHz solves problem

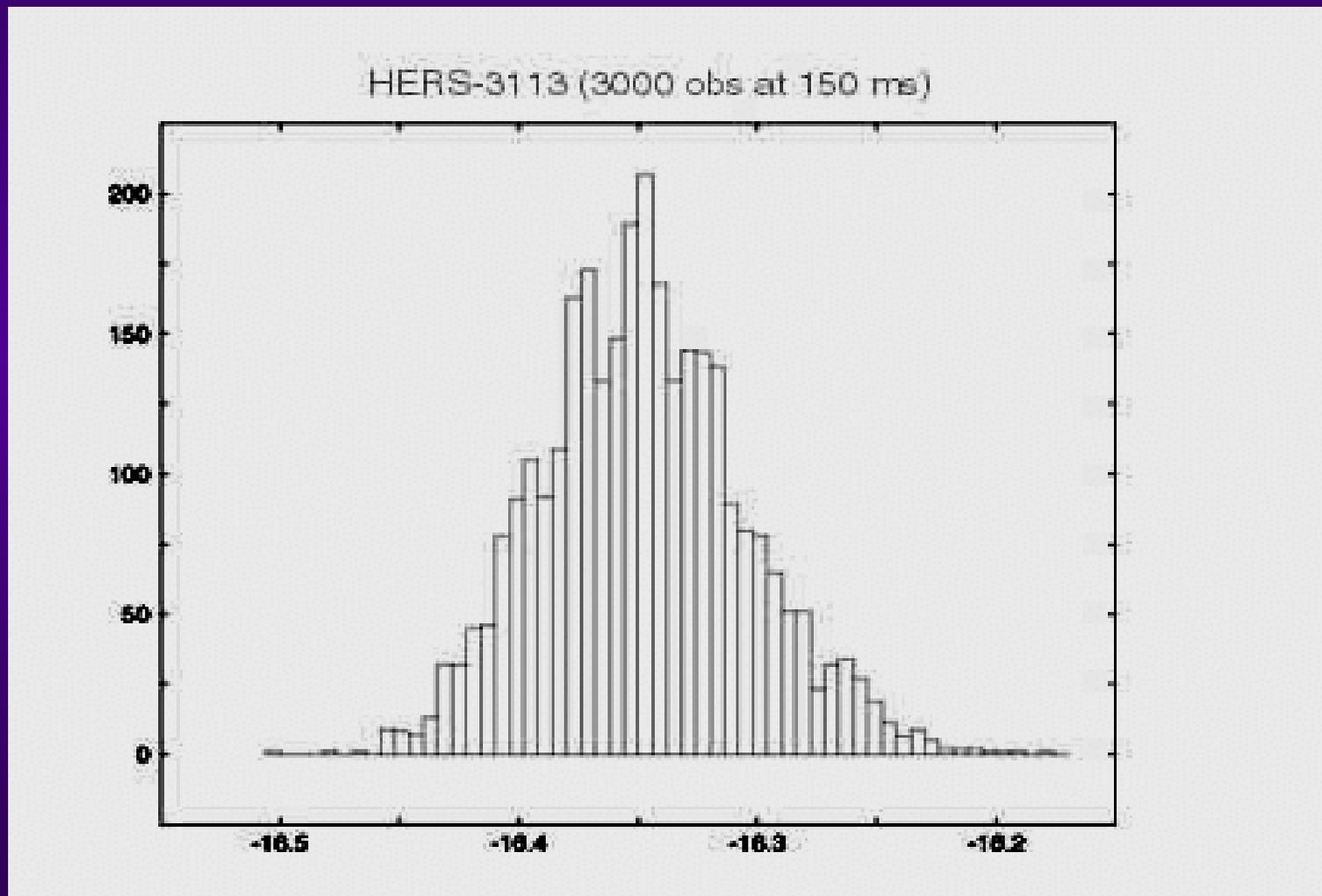


Counter Comparison: HERS-3113



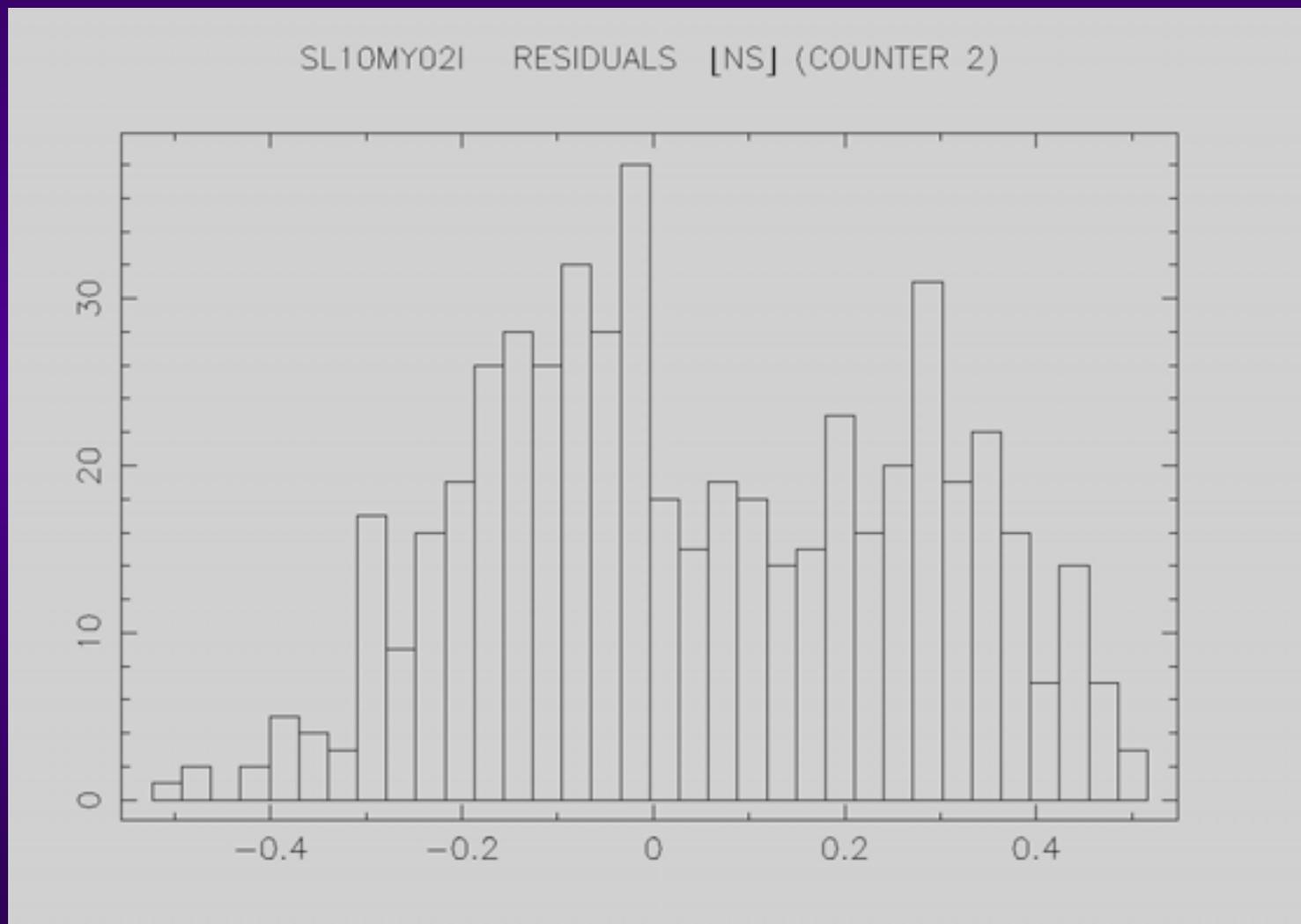


Error Distribution



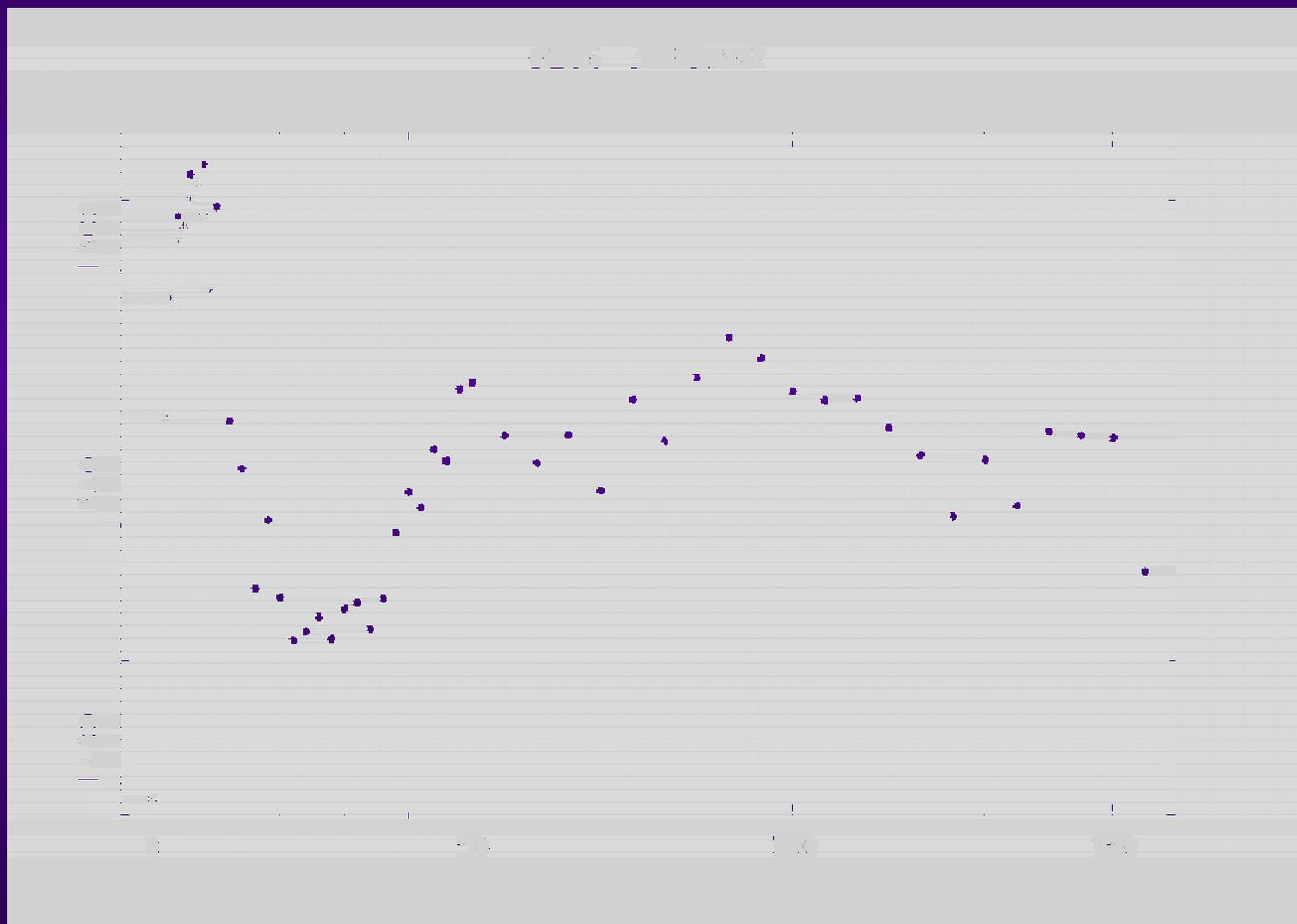


Residuals of Satellite Pass



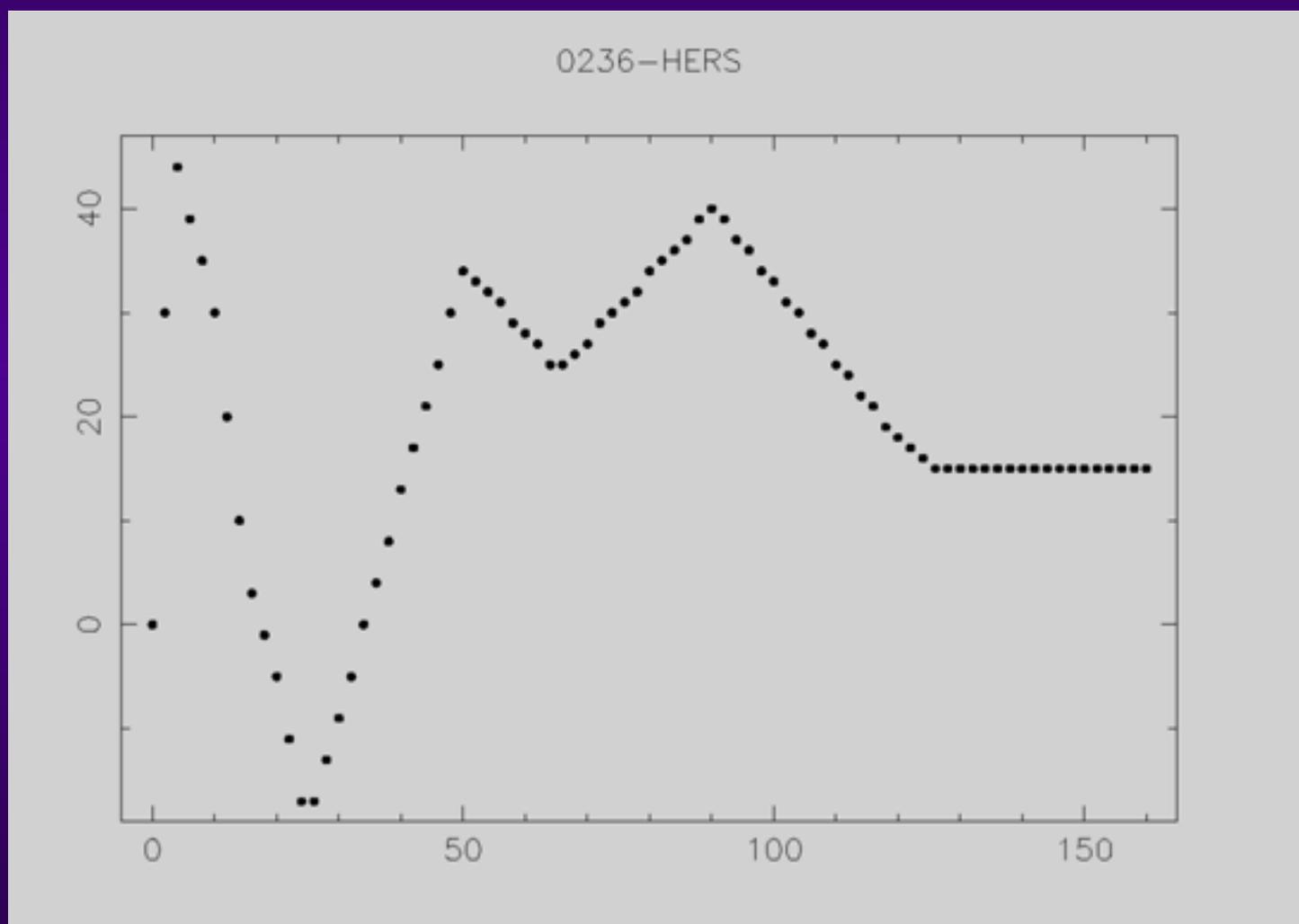


Averaged differences 0236-3113





*Combined with HERS Comparison:
0236-HERS, piecewise linear*





Application of Counter Calibrations

- ◆ Tables with correction values, to be linearly interpolated, for each counter used in system
- ◆ In use since 29 May 2002, 00:00 UT

```
! Counter differences 0236-HERS
! Computed from 0236-3113
! and 3113-HERS
! May 2002
!
! time of flight  correction
!      (ms)      (ps)
!
      0           0
      2          30
      4          44
     25         -17
     50          34
     65          25
     90          40
    125          15
    160          15
```

```
! Counter differences 3113-HERS
! Observed in Herstmonceux
! March 2002
!
! time of flight  correction
!      (ms)      (ps)
!
      0           0
      2          -50
      6          -75
     10          -60
     20          -50
     60          -45
    120          -55
    160          -55
```